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MIMICRY IN ANIMALS: A NEW THEORY

BY HUDSON MAXIM

When a bird casts his eye upon a worm, there is question in his glance. He looks inquiringly at the worm, to be assured that it is a proper food-worm, and not some poisonous serpent that he or his ancestry has had trouble with. As he looks at the worm, he recalls to mind previous experiences, either individual or ancestral, with the puff-adder. That mental process is reflected in the mental impressorium of the worm in some such wise as though the bird should ask the worm whether or not he were a puff-adder or a food-worm. This sets the worm to concluding that the possession of so small a resemblance as even to rouse the slightest suspicion in the mind of the bird, and cause him to hesitate to inquire whether or not he were a puff-adder, is a recommendation to the worm to imitate the puff-adder, and he proceeds to do so.

This same telepathic process must exist throughout nature. Of course, the degree in which it exists may be, and doubtless is, infinitely slight. The influence on each individual occasion may be practically negligible, but when this influence has been exerted billions upon billions of times, the cumulative effect is very great.

This is why one form of butterfly chooses to look like a dead leaf, another like a green leaf; why the chameleon changes his color, why the Brazilian butterfly looks like an owl that is the greatest enemy of the bird that is the butterfly's greatest enemy.

The quick glance of the flitting bird at the remote progenitor of the walking-stick beetle, to decide whether or not it were a dry twig, taught the beetle to imitate the dry twig for its protection.

It must be remembered that there is no dividing line between mental and physical processes—the one merges into the other. The mental process is a physical process, and all physical processes are to a large extent mental processes.

The very fact that we are so highly organized places us out of sense with many things with which we would be keenly in sense were we but possessed of a worm's specialized mentality, and endowed with a worm's necessities. It is inconceivable to us how the bat can sense and determine the exact position of a mosquito in the dark with an exactness greater than eyesight. It is inconceivable to us how the bloodhound can follow the faint footprints of a man or animal with unerring accuracy from an odor so inconceivably faint as to be beyond our imagining.

It is no more inconceivable, no stranger, that the nervous structure of a lower order of animal may be so sensitized to special environing influences as particularly to be constituted to perceive or feel out the mental processes of an enemy that is hunting him for prey, and to take the hint from his enemy that would cause him, as I have pointed out, to imitate the very thing his enemy has told him would protect him if he looked enough like that thing.

Life is the co-ordination of the motional relations constituting the character of a body with the motional relations constituting the character of other bodies.

The motional relations constituting the character of every body must of necessity be sensitively responsive to the motional relations constituting the character of all other bodies in measure proportionately correspondent with the chief necessities of the body. In other words, life is the functional response of an organized body to the forces of surrounding matter, termed the environment.

A living being is a body of matter organized to utilize the forces and properties of surrounding matter for its functions of life and reproduction.

The condition of everything in existence acts to modify the condition of everything else in existence, according to their inter-related necessities, with an intensity proportionate to their necessities, their nearness to one another, and their developed mutual receptivity.

Mimicry in animals has always been an unsolved mystery —a mystery popularly deemed unsolvable except on the hypothesis of an all-wise, all-powerful, omnipresent, personal God, who, by direct interposition, specializes animals to adapt them to the necessities of their environment. But I think that the problem admits of scientific solution. I think that I can explain the mystery.

Knowing that everything in existence is sensitized to everything else in existence, we know, therefore, that there can be no state of being which does not tend to impress its condition upon or betray its condition to other existences whose necessities develop in them faculties of awareness—senses to meet their requirements—besides those senses that we count on the fingers of one hand.

When I was a boy, I often used to catch bees by the two wings while they were sucking honey from a flower, and thereby hold them in such a position as to prevent them from stinging. Sometimes I would miss my bee, catching him by one wing, and then I would get a sting. One day I caught what I supposed to be a bee, and missed getting him by both wings. I was surprised that he did not sting me. On examination, I discovered that he was not a real bee at all, but a species of fly. I have since learned that that fly was a representative of the class of animals that finds protection in mimicking other animals. That species of fly, like a bee, lives mainly upon the honey of flowers. Fly-catching birds, through long ages, fed upon the ancestors of that fly. Each time one was caught, he was asked the question, with a look of the bird, whether or not he were a bee or a fly, and he took the hint, and by slow degrees became to look more and more like a real bee, so that he found greater and greater protection in his looks, and the largest numbers of those flies survived that looked the most like bees. So complete is the resemblance now as to afford very efficient protection against being devoured, for the bird does not want to take any chances on his turning out to be a bee and able to deliver a sting in the throat.

Our higher and more complicated development of mind and body does not better qualify us, but, on the contrary, largely disqualifies us to perceive with certain senses as keenly as do lower animals, with their more highly specialized senses.

The olfactory mechanism of the dog is far superior to ours. The engineering skill of the spider transcended that of human beings until recent times. The bat possesses an absolutely additional sense, of which we have no counterpart: in the depths of a cave half a mile by a winding way from its entrance, a place wholly devoid of light, bats will flit about the head of an intruder, but will always avoid coming into collision, as though they were swallows in open daylight.

Many an insect whose necessities have caused him to specialize in the development of a telepathic perceptive sense is far superior to us in the exercise of such faculty.

Anciently, we may very possibly have had a more highly developed telepathic sense, but as we have evolved means for communication, especially through speech, we have supplanted one kind of sense-perception by another kind more suited to our purpose, with the result that certain telepathically-perceptive faculties have now become largely atrophied.

Similarly, we have lost our former aptitude for grasping and handling objects with our feet, because our hands have served the purpose as grasping organs, and our feet have become specialized better to adapt them to their present use. We were once able, doubtless, to flap our ears to dislodge flies, but we no longer possess that faculty. We once possessed strong and heavy jaws armed with long fangs, for tearing meat and for peeling nuts and fruits, and our hands were armed with claws, but we have no longer any need for claws and fangs, because we are better armed with ingenious intelligence.

After making many experiments in an attempt to ascertain whether ants are susceptible to sounds within the range of the human ear, and finding that they are apparently deaf to such sounds, Sir John Lubbock came to the following conclusion:

> It is, however, far from improbable that ants may produce sounds entirely beyond our range of hearing. Indeed, it is not impossible that insects may possess senses, or sensations, of which we can no more form an idea than we should have been able to conceive red or green if the human race had been blind.

It is an irrational conclusion that an insect, simply because he is an insect and smaller than we, does not know his business as well as we know ours. As a matter of fact, many an insect knows his business as well for his needs as we know ours, and the action of certain insects can not be other than rational, involving planning and calculation.

The word *instinct,* as a distinction between the intelligence of man and of lower animals, should be abandoned for all time. Instinct in the lower animals is but inherited experiential knowledge. Much of what we know is likewise inherited experiential knowledge. The child who learns with great facility something for which his immediate progenitors possessed especial aptitude, acquires but part of the knowledge by his own efforts; the rest comes to him as instinctive knowledge inherited from those progenitors.

I once saw, on the porch of my residence on Lake Hopatcong, a mud-hornet deliberately fall into and entangle herself in a spider-web. The spider, perching upon an outer corner of the web, instantly sprang at the hornet, then stopped, and decided that it did not want to tackle that hornet, and returned to its perch. After waiting awhile for the spider to come to the attack, the hornet freed herself very easily from the web; and I watched her fly several times in circles, and then deliberately alight in another nearby web, and entangle herself in it. Instantly, the alert spider, evidently either more hungry or less cautious than the other, sprang upon the hornet, when, with an alacrity that would shame the lightning, and with a precision developed beyond the contingency of error, that hornet seized the spider, jabbed her sting into it and paralyzed it. Then she did it up nicely and carried it away.

I learned afterward, in the study of insects, that this is the regular habit of the mud-hornet—that she catches spiders in this manner, paralyzing them with her sting. She places them, one after another, in a mud-pocket that she has constructed for the purpose, until she has enough canned spiders to feed her young when they hatch out in the spring. The spiders do not die, but remain alive in their prison until attacked by the larvæ of the hornet and eaten at the proper time. Rather hard on the spiders—but the habits of the spiders themselves are not such as to elicit much sympathy.

Another day, I was watching a spider's web on the porch of my country house, hoping again to see a mud-hornet play the same trick on a spider. After long waiting, I was rewarded for my vigil. A mud-hornet jumped into the web of a spider, pretending to entangle herself in it. The spider made a dash for the hornet, but drew back a little distance, and regarded her cautiously, finally concluding that it was too risky. After waiting awhile for the spider to make the attack, the hornet pretended to struggle again and to entangle herself inextricably in the web. I thought, "Madame Hornet, you have overdone it this time." The spider thought the same thing, and attacked the hornet. No magician ever unbound himself from a knotted rope with the cleverness with which that hornet released herself from the web, and it was all done with the quickness of a cat striking with its paw.

A condition of mind is a physical condition. It is a physiological condition. It is as much a physical, chemical, electrical phenomenon as is the production of a spark from the discharge of a storage battery exploding a gas mixture in an internal combustion engine. It is as much the result of arrangement of atoms and molecules as is the formation of a frost-crystal. It is as much an electro-mechanical phenomenon as is the establishment of an electric current in an induction coil.

It is a no stranger phenomenon that a certain electrical condition produced in the mind of a bird on seeing a worm should influence the receptive mechanism in the terminal ganglion of a worm, a butterfly, or a beetle, than is the phenomenon that a current of electricity will by induction set up a current in a distant coil absolutely without physical contact. It is no stranger a thing that there should be ultra-Hertzian waves than it is that there are Hertzian waves.

Since we are able, through wireless telegraphy, by means of Hertzian waves, actually to operate a mechanism and record thought at a distance of several thousand miles, we certainly have a right to suspect that the worm or the butterfly may have a nerve-apparatus capable of catching vibrations set going by the thinking mechanism of a bird of prey, and of interpreting their meaning and of profiting by the interpretation.

In this age of experimental investigation, when, as far as possible, we put everything to a practical test before shaping our conclusions in regard to it, it may appear at first sight that the conclusion that a worm can read the mind of a bird is rather fanciful and chimerical. As we go back, however, over the steps of our reasoning which led us up to this conclusion, it does not look so chimerical or so fanciful.

We know positively that no mental phenomenon can take place without leaving an impress of some character upon surrounding media, because no condition of any structure can exist without that condition making its impress upon surrounding media, tending to alter the conditions existing in those surrounding media. Consequently, we know with absolute certainty that a thought can not exist in the mind of a bird without that thought exerting an influence upon other life in the neighborhood of the bird, and that one thought exerts a different influence upon the mental mechanism of a worm than will another thought. These things we know; the only thing we do not know, and can not very well prove by practical experiment, is that the worm is able to utilize that influence in the way I have suggested.

If a man could live a million years and experiment with birds and worms and butterflies, as Darwin experimented with doves and other animals to prove his theory of natural selection, we might prove our theory of the cause of mimicry to the extent of showing that certain animals do assume the guise of other animals, or mimic them, for purposes of self-protection against their enemies, but we should not know then any better than we now know, that the change was produced in the manner I have suggested. Although this conclusion must, of necessity, be entirely theoretical, it is certainly a rational theory, and one which should be accepted as most likely to account for the strange phenomena of mimicry in lower animals.

There are many well-authenticated instances which strongly tend to warrant the conclusion that certain lower animals possess peculiar psychic powers not usually understood—powers by which they are able to interpret the bent of mind of human creatures in whose presence they happen to be.

Many a time, when the owner of a dog has determined to kill the dog in order to get rid of him for some reason or other, the dog immediately seems to discover the fact that there is some evil purpose brewing for him, and he will often slink away and hide without any apparent cause. Of course, the voice of the master in calling the dog may change, and the dog will discover a sinister meaning in the difference of the voice, or the master's countenance may change, that is to say the master may manifest in his face his intentions regarding the dog. But there have been many instances when there has been no opportunity for the dog to tell by the change in his master's demeanor or change of voice, and he has seemed to gather a warning directly from the operations of his master's mind.

I admit that there may never have been a single instance in authentic proof of this conclusion, but there have been instances enough to lead to a strong suspicion that the mind of a dog may be in such receptive telepathic attitude with respect to the mind of his master as to interpret the bent of his master's thoughts concerning the dog's welfare; and the dog's welfare is the principal thing that can concern the dog.

In arriving at such conclusions as these, it is necessary for us to be strongly on our guard and to maintain alert vigilance against being humbugged by the deceit of others or by our own sentiments and imagination.

When we desire a thing, it is much easier to believe that thing than when we do not desire it. In spiritualistic investigations, this human peculiarity has given the wildest fancies the guise of scientific evidence.

In the interpretation of any natural phenomenon, we must not take our lack of ability to understand its having been produced in any other way as proof that it must have been produced in a certain hypothetical way. This we must admit applies to my suggestion of the explanation of mimicry in animals. We have not sufficient evidence to know whether this hypothesis is true or not, only enough to know that it is both possible and rational and based upon the broad foundation in fact that nothing can exist except under the domination of the universal influence of all things else, of which influence it is a sensitized reciprocal part; and that there must be a mutual influence exerted between the mental mechanism of lower animals existing in the neighborhood of one another. We further know that those animals have developed on the lines of their chief necessities; that, consequently, they are capable of utilizing any influence to meet their necessities.

Therefore, may we not conclude that it is reasonable to believe that hunted animals must have used any influence exerted upon them by hunting animals in the development of mimicry for defense, if that mimicry has been a necessity?

HUDSON MAXIM.